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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,720	11/12/2003	Steve Montellese		7238
26285 7590 08/29/2008				
K&I. GATES LLP				
535 SMITHFIELD STREET				
PITTSBURGH, PA 15222				
EXAMINER				
HOLTON, STEVEN E				
ART UNIT		PAPER NUMBER		
2629				
MAIL DATE		DELIVERY MODE		
08/29/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/706,720

Applicant(s)

MONTELLESE, STEVE

Examiner

Steven E. Holton

Art Unit

2629

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 April 2008.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 13-21 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-4 and 13-21 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

1. This Office Action is made in response to applicant's amendment filed on 4/3/2008. Claims 1-4 and 13-21 are currently pending in the application. An action follows below:

Response to Arguments

2. Applicant's arguments filed 4/3/08 have been fully considered but they are not persuasive.

The Examiner does agree that the Bell reference is not used for determining position of interaction with a holographic interface, the Examiner disagrees that one of ordinary skill in the art would not find the teachings of Bell combinable with Arnon to produce an interactive holographic input system.

The applicant states that holographic pattern analysis requires a three dimensional interference pattern. However, this interference pattern is sensed by a single two-dimensional optical sensor such as a camera system. The resulting signal from the camera system is a two-dimensional representation of the interference pattern measured by the sensor at that particular planar location. While an observing human does see a three-dimensional holographic image, the camera sensor only perceives a two dimensional interference pattern of light. Analysis of this two-dimensional image using the techniques described by Bell and other well known image analysis techniques could be then utilized for determining a position of a user interacting with the area including the projected image. Bell includes teaching of subtracting the projected image

from the received image as part of the method for determining object location of the input system (col. 5, lines 51-57). Arnon teaches using a camera of CCD system taking a picture of the projected holographic input system (col. 6, lines 41-56). Therefore, the camera taking the image of the projected holographic image would include the interference pattern of the holographic image as well any objects interacting with the hologram. This image could then be processed using the techniques of Bell but adapted based on the projected holographic images rather than the non-holographic images used in the imaging system described by Bell.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-4 and 13-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon (USPN: 6650318) in view of Bell (USPN: 7259747).

Regarding claims 1 and 16, the Examiner notes these claims are drawn to a device and associated method of operation and are considered together, Arnon discloses an input detection system comprising a system for projecting a holographic image onto an area (Fig. 2, element 65), a reception device that registers the imaged area and responds to the wavelength of light of the projected interface (Fig. 1, element 40; col. 6, lines 45-46).

However, Arnon does not expressly disclose determining a difference pattern between an interference pattern for the original holographic image and an interference pattern for the image sensed by the reception device, and using the difference pattern to project a modified holographic image that represents a change in the original holographic image.

Bell discloses an optical input system wherein the difference between an originally projected image and a current image is used to determine interaction with a projected image. Bell discloses providing a pattern over a sensing surface (col. 7, lines 48) and then finding the difference between the original pattern and the currently detected pattern to determine the location of an object interacting with the projected image area (col. 7, lines 49-64). Bell further discusses the pattern method of detection in Fig. 5 and col. 8, lines 49-67. Bell then discloses using the determined location to as a basis for interacting with a projected image (Fig. 6).

At the time of invention it would have been obvious to modify the teachings of Arnon with the teachings of Bell to produce an interactive holographic system that detects interaction based on a difference between a projected pattern and a sensed pattern. The Examiner notes that although Bell deals with non-holographic images it would be obvious to one skilled in the art that holographic and non-holographic images will produce a light pattern on a camera. A 'background' image of a holographic image could be determined just as readily as determining a background image of a non-holographic image. Thus, the difference method described by Bell could be utilized using a holographic pattern just as easily as a non-holographic pattern. Further, the

light detectors used by Arnon (Fig. 8, elements 108 and 110) could be replaced by a single or multiple cameras to take images of the interaction area. This would be similar to the off angle system shown by Bell in Fig. 4. Rather than detecting reflected light from a finger and triangulating the position as described by Arnon, an image of the entire detection area could be compared with a background image to determine the position of any interaction using the difference method of Bell. The rationale for combination would be to replace one method of position determination with a different method of position determination to produce the same results. Thus, it would have been obvious to combine the teachings of Arnon and Bell to produce a holographic device with image interaction as described in claims 1 and 16.

Regarding claim 2, the Examiner notes that reflective solid state imaging devices are well known in the art. Digital micromirror devices (DMDs) are well-known as being used to redirection of light for the purposes of projecting images and solid state devices. It would have been obvious to one skilled in the art that a DMD or similar reflective solid state imaging device could be used to project holographic image using the light beam system of Arnon.

Regarding claims 3 and 14, the Examiner notes that solid state sensing devices, such as CCD optical sensors are well known in the art and are commonly used in digital camera technology. It would have been obvious to one skilled in the art to use a CCD or other type of solid state sensing device as the camera device described by Bell for receiving an image to be processed by a computer.

Regarding claim 4, Arnon discloses the image representing a keyboard (Fig. 6) and also as a game (Fig. 17).

Regarding claim 13, the Examiner notes that transmissive solid state imaging devices such as liquid crystal shutters are well known in the art for use as part of image projection systems. It would have been obvious to one skilled in the art that a liquid crystal shutter or similar type of transmissive solid state imaging device could be used as part of the holographic projection system described by Arnon.

Regarding claim 15, the Examiner states that producing a holographic image of a steering wheel would be a matter of design choice for one skilled in the art. Arnon clearly shows projecting a variety of holographic images of different layouts and shapes (Figs. 3A – 3E, 16 and 17). It would be a matter of design choice for one skilled in the art to display a steering wheel or any other holographic image depending on the type of interactive holographic display desired.

Regarding claim 17, Arnon discloses displaying original holographic images that are user input devices (Figs. 3A – 3E). Bell discloses that a difference between an original displayed image (background) and a detected image is caused by a user interacting with a projected image. The difference between a detected image of a holographic input device shown by Arnon and a person interacting with a projected holographic image would produce a similar difference between the original image and a detected image and the difference methods of Bell could be used to determine the interaction of a user with the projected input device.

Regarding claims 18 and 19, Arnon discloses displaying a keyboard (Fig. 3A) and the Examiner states that producing a steering wheel would be a matter of design choice for one skilled in the art.

Regarding claims 20 and 21, the Examiner states that the methods of feature space analysis and bit map comparison to determine the difference between images are well known in the art and it would be a matter of design choice for one skilled in the art to use either technique for determining the differences between two images.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven E. Holton whose telephone number is (571)272-7903. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala can be reached on (571) 272-7681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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August 28, 2008
/Bipin Shalwala/
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